

Laboratories

530SW 90027M

Industry Overview

Not all laboratories produce hazardous waste. If, however, you use ignitable compounds, strong acid or alkaline solutions, solvents, heavy metals, or toxic organic constituents, the waste you generate might be hazardous. If you generate hazardous waste, you might be subject to Resource Conservation Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Laboratories that use chemicals are likely to generate hazardous waste. These laboratories include:

- Research and development laboratories, such as government labs (e.g., National Institutes of Health, Food and Drug Administration) and industrial labs (e.g., chemicals, pharmaceuticals)
- Commercial testing laboratories, including labs that analyze hazardous waste samples
- Academic laboratories, such as university and high school labs, and labs of educational or scientific organizations
- Medical laboratories, including hospital and dental labs.

Hazardous Wastes from Laboratories

A large variety of wastes are generated by laboratories. The following wastes are commonly generated:

Spent solvents used in cleaning, extraction, or other processes

Unused reagents that are no longer needed, do not meet specifications, are contaminated, have exceeded their storage life, or are otherwise unusable in the lab

Reaction products of known or unknown composition, which are often produced by research and academic labs. (To facilitate disposal, labs should try to identify or characterize reaction products to the extent possible and label them with this information.)

Testing samples that are not entirely consumed by the test procedure

Contaminated materials such as glassware, paper, and plastic products.

If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 1 lists DOT shipping descriptions for some wastes generated by laboratories. Table 1 is not a comprehensive list. If you do not find your waste here but suspect it is hazardous, contact your EPA Regional office or state hazardous waste management agency for additional information.

Radioactive waste, which is generated by some laboratories, is generally regulated under the Atomic Energy Act and in many cases is excluded from RCRA regulation. Nuclear Regulatory Commission and DOT regulations might apply. Contact the Nuclear Regulatory Commission, the DOT Materials Transport Bureau, or your state transportation agency for more information concerning proper transport and disposal of radioactive waste.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Laboratories Waste Descriptions¹

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
SOLVENTS				
Acetone		Waste Acetone	Flammable Liquid ²	UN1090
Benzene*		Waste Benzene	Flammable Liquid	UN1114
Chloroform*		Waste Chloroform	ORM-A	UN1888
Trichloromethane				
1,4-Dioxane		Waste Dioxane	Flammable Liquid	UN1165
Diethylene Ether				
1,4-Diethylene Oxide				
Diethylene Oxide				
Dixyethylene Ether				
Ethanol		Waste Ethyl Alcohol	Flammable Liquid	UN1170
Ethyl Alcohol				
Grain Alcohol				
Ethyl Ether		Waste Ethyl Ether	Flammable Liquid	UN1155
Ether				
Diethyl Ether				
Diethyl Oxide				
Formalin		Waste Formaldehyde Solution	ORM-A (or Combustible Liquid if shipped in containers larger than 110 gallons)	UN2209
Formaldehyde Solution				
(1) flash point greater than 141°F				
(2) flash point less than or equal to 141°F		Waste Formaldehyde Solution	ORM-A (or Combustible Liquid if shipped in containers larger than 110 gallons)	UN1198
Hexane		Waste Hexane	Flammable Liquid	UN1208
n-Hexane				
Isopropanol		Waste Isopropanol	Flammable Liquid	UN1219
Isopropyl Alcohol				
TPA				
Dimethyl Carbinol				
2-Propanol				
Methanol		Waste Methyl Alcohol	Flammable Liquid	UN1230
Methyl Alcohol				
Wood Alcohol				
Methyl Ethyl Ketone*		Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
MEK				
2-Butanone				
Methylene Chloride		Waste Dichloromethane (or Waste Methylene Chloride)	ORM-A	UN1593
Dichloromethane				
Pentane		Waste Pentane	Flammable Liquid	UN1265
Petroleum Ether		Waste Petroleum Ether	Flammable Liquid	UN1271
Tetrahydrofuran		Waste Tetrahydrofuran	Flammable Liquid	UN2056
THF				
Toluene		Waste Toluene	Flammable Liquid	UN1294
Toluol				
Methyl Benzene				
Xylene		Waste Xylene	Flammable Liquid	UN1307
Xylol				
Dimethyl Benzene				

Table 1 (continued)
Laboratories Waste Descriptions¹

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Carbon Tetrachloride* Carbon Tet Tetrachloromethane Perchloromethane		Waste Carbon Tetrachloride	ORM-A	UN1846
Ignitable Liquids		Waste Flammable Liquids, NOS ³ Waste Combustible Liquids, NOS	Flammable Liquid Combustible Liquid	UN1993 NA1993
ACIDS/BASES				
Acetic Acid		Waste Acetic Acid, Glacial Waste Acetic Acid, Solution	Corrosive Material Corrosive Material	UN2789 UN2790
Hydrochloric Acid		Waste Hydrochloric Acid	Corrosive Material	UN1789
Nitric Acid		Waste Nitric Acid, over 40% Waste Nitric Acid, 40% or less Waste Nitric Acid, Fuming	Oxidizer Corrosive Material Oxidizer	UN2031 NA1760 UN2032
Perchloric Acid		Waste Perchloric Acid, not over 50% acid Waste Perchloric Acid, exceeding 50% but not exceeding 72% acid Waste Perchloric Acid, exceeding 72% acid	Oxidizer Oxidizer Forbidden ⁴	UN1802 UN1873
Sulfuric Acid		Waste Sulfuric Acid Waste Sulfuric Acid, Spent	Corrosive Material Corrosive Material	UN1830 UN1832
Oleum Fuming Sulfuric Acid		Waste Oleum	Corrosive Material	NA1831
Ammonium Hydroxide Ammonia Solution Aqueous Ammonia		Waste Ammonium Hydroxide, containing less than 12% ammonia Waste Ammonium Hydroxide, containing not less than 12% but not more than 44% ammonia	ORM-A Corrosive Material	NA2672 NA2672
Potassium Hydroxide Caustic Potash		Waste Potassium Hydroxide, Solid Waste Potassium Hydroxide, Liquid	Corrosive Material Corrosive Material	UN1813 UN1814
Sodium Hydroxide Caustic Soda Lye		Waste Sodium Hydroxide, Solid Waste Sodium Hydroxide, Liquid	Corrosive Material Corrosive Material	UN1823 UN1824
NON-SPECIFIC WASTES				
Corrosive Liquids		Waste Corrosive Liquids, NOS	Corrosive Material	UN1760
Corrosive Solids		Waste Corrosive Solid, NOS	Corrosive Material	UN1759
Oxidizer, Corrosive, Liquid		Waste Oxidizer, Corrosive, Liquid, NOS	Oxidizer	NA9193
Oxidizer, Corrosive, Solid		Waste Oxidizer, Corrosive, Solid, NOS	Oxidizer	NA9194
Oxidizer		Waste Oxidizer, NOS	Oxidizer	UN1479
Poisonous Liquid ⁵		Waste Poison B, Liquid, NOS	Poison B	UN2810
Poisonous Solid		Waste Poison B, Solid, NOS	Poison B	UN2811
Corrosive, Poisonous Liquid		Waste Corrosive Liquid, Poisonous, NOS	Corrosive Material	UN2922

Table 1 (continued)
Laboratories Waste Descriptions¹

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Poisonous, Corrosive Solid		Waste Poisonous Solid, Corrosive, NOS	Poison B	UN2928
Poisonous, Oxidizing Liquid		Waste Oxidizer, Poisonous, Liquid, NOS	Oxidizer	NA9199
Poisonous, Oxidizing Solid		Waste Oxidizer, Poisonous, Solid, NOS	Oxidizer	NA9200
Hazardous Waste Liquid ⁶		Hazardous Waste, Liquid, NOS	ORM-E	NA9189
Hazardous Waste Solid		Hazardous Waste, Solid, NOS	ORM-E	NA9189

- * Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.
- 1 These descriptions may change given variations in waste characteristics, conditions or process modifications. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA categories of hazardous waste.
- 2 Substances with a flash point less than 100°F are classified as "Flammable Liquid"; substances with a flash point greater than or equal to 100°F and less than 200°F are classified as "Combustible Liquid."
- 3 NOS - Not Otherwise Specified.
- 4 Forbidden materials are prohibited from being offered or accepted for transportation.
- 5 Certain gases and volatile liquids (e.g., cyanogen, phosgene) are classed as Poison A. The gases and liquids have a different UN/NA ID; NA 1953 for poisonous liquid or gas, flammable, NOS; or NA 1955 or poisonous liquid or gas, NOS.
- 6 Materials (e.g., disposable labware) contaminated with small quantities of a variety of hazardous substances generally can be classified as Hazardous Waste, NOS, unless a more specific DOT shipping name applies. The entire weight of the contaminated materials, not just the weight of the substance(s) making it hazardous, is considered when determining quantity.

For further information call the RCRA/Superfund Hotline 1-800-424-9346